Beyond the bending point: Engineering precision into agricultural waste

For decades, non-traditional biomass species have faced scepticism across the woodworking industry. Concerns over density variation, moisture management and structural consistency have contributed to the perception that agricultural residues cannot deliver industrial-grade performance in engineered panels. This has left significant streams of agricultural biomass underutilised.

Wood has long been the baseline material for construction and furniture manufacturing. However, tighter forest regulations and rising environmental, social and governance (ESG) demands are prompting the panel industry to seek solutions that build on wood's strengths while addressing its constraints.



Tensile testing of OnCore PalmCore

THE SCIENCE OF ONCORE

IOI Palm Wood has developed OnCore PalmCore, an engineered core material made from oil palm trunks. Engineering and conditioning processes stabilise density and control cell moisture to provide consistent performance.

Manufactured with low-emission, formaldehyde-free adhesive systems, OnCore supports indoor air quality requirements and compliance with standards including CARB P2, EPA TSCA Title VI and F-Four Star.

The cellular vascular structure of oil palm trunks produces a lightweight core that can reduce panel weight, making handling easier, lowering freight costs and reducing loads on architectural hardware.

OnCore provides screw-holding capability, flat dimensional stability and natural acoustic damping for solid door cores, interior partitions and high-end furniture components. Controlled thermal conditioning further improves resistance to warping, swelling and seasonal movement.

Its formulation can also provide flame-retardant performance compared with standard softwoods.

THE STAMP OF TRUST

OnCore has achieved SIRIM Ecolabelling and the MyHijau Mark, as well as certification under MSPO MS2751:2022 (Chain of Custody for Oil Palm Biomass).

With the forthcoming EU Deforestation Regulation (EUDR), importers face additional requirements around supply-chain origin and forest degradation tracking. As OnCore is derived from agricultural plantation replanting rather than forestry logging, the MS2751 certification provides a traceable supply chain that can support EUDR compliance.

Third-party verified Life Cycle Assessments (LCA) also show a non-positive carbon footprint per unit of product on a cradle-to-gate basis, providing data for corporate ESG reporting.



Inspiring the next "material revolution" by creating sustainable and high-performance materials from oil palm waste, **Peter Fitch**, together with IOI, have set up IOI Palm Wood to commercialise this untapped potential.

A COMPARATIVE MATRIX

Metric	OnCore palm wood	Traditional solid timber	Particleboard / MDF
Sustainability	100% agricultural biomass; zero deforestation impact	Requires managed forest or timber plantation harvesting	Utilises industrial offcuts, mill residues and roundwood chips
EUDR and traceability	MS2751-certified; traceable supply chain	Requires forest-origin and, where applicable, geolocation verification	Mixed wood species can present additional chain-of-custody requirements
Emissions	Formaldehyde-free adhesive option	Natural low emissions	Varies; often uses synthetic binders with potential volatile organic compound (VOC) emissions
Weight and handling	Lightweight core structure; optimised for freight efficiency	Variable density; can add to overall weight	Moderate to heavy board weight
Applications	Door cores, engineered panels and joinery	Structural framing and solid joinery	Flat-pack furniture and general interior cabinetry
Dimensional stability	Designed to resist warping and seasonal movement	Prone to movement, cupping and twisting due to grain tension	Moderate stability; sensitive to edge moisture absorption



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WHAT IT MEANS FOR MANUFACTURERS

Adopting OnCore could provide a more uniform substrate, potentially reducing waste and improving cost efficiency.

Its dimensional stability can help reduce defects and maintain product integrity from production through installation. Compatibility with CNC machining, gluing, edgebanding and finishing can also support existing workflows and minimise disruption.

Its lightweight and strength properties can suit furniture and architectural applications where reduced panel weight is an advantage. Its sustainability credentials can also support international compliance frameworks and brand positioning in environmentally conscious markets.

Wood is good, but OnCore PalmCore is engineered for modern manufacturing — combining technical performance, EUDR compliance and verified sustainability in a single lightweight substrate. P

All images courtesy of IOI Palm Wood.

LEGEND

1 OnCore PalmCore
2 OnCore three-layer panel